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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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In re application of: Zhu et al.

Attorney Docket No.:

NOVLP090/NVLS-002888

Application No.: 10/733,858

Examiner: Smith, Bradley

Filed: December 10, 2003

Group: 2891

Title: BIASED H<sub>2</sub> ETCH PROCESS IN  
DEPOSITION-ETCH-DEPOSITION  
GAP FILL

Confirmation No. 7860

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Signed: 

Natalie Morgan

**AMENDMENT B (Filed with RCE)**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

This amendment is being filed with a Request for Continued Examination and addresses the rejections made in the Final Office Action mailed October 7, 2005. Please consider the following remarks and amendments prior to taking further action on this application:

Amendments to the Claims are reflected in the listing of claims which begin on page 2 of this paper.

Remarks/Arguments begin on page 6 of this paper.

10/733,858  
NOVLP090/2888

The listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (presently amended) A method of filling gaps on a semiconductor substrate, the method comprising:
  - (a) partially filling a gap on a semiconductor substrate with a dielectric using a high density plasma chemical vapor deposition process and deposition chemistry comprising a silicon-containing dielectric precursor;
  - (b) partially removing dielectric deposited in the gap from the gap opening by an etch back process conducted with etch process chemistry free of silicon-containing dielectric precursor and consisting essentially of hydrogen, wherein the substrate is biased during the etch back process and the etch rate is determined by the substrate bias power;
  - (c) further filling of the partially filled gap by a high density plasma chemical vapor deposition process and deposition chemistry comprising a silicon-containing dielectric precursor.
2. (original) The method of claim 1, wherein (b) and (c) are repeated until the gap is filled.
3. (original) The method of claim 1, wherein (b) comprises a substantially isotropic plasma etch.
4. (original) The method of claim 1, wherein the etch rate increases with increasing substrate bias power.
5. (original) The method of claim 1, wherein the substrate bias power is set between 500 and 5000W.
6. (original) The method of claim 1, wherein the bias to source plasma power ratio for

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**BEYER WEAVER & THOMAS, LLP**

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**FACSIMILE COVER SHEET**

January 9, 2006

Receiver: Examiner Smith, Bradley  
Art Unit 2891

TEL #:

FAX #: 571-273-8300

Sender: Natalie Morgan for:  
James E. Austin

Serial No. 10/733,858  
Our Ref. No.: NOVLP090/NVLS-002888

Re: Amendment B (filed w/RCE)

Pages Including Cover Sheet(s): 17

Fax Contents: Fax Cover Sheet- 1 page  
Request for Continued Examination (RCE)- 2 pages  
Amendment Transmittal-1 page  
Amendment B (filed with RCE)- 8 pages  
Information Disclosure Statement (as filed on January 9, 2006)- 1 page  
PTO Form 1449 (as filed on January 9, 2006)- 4 pages

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Signed: 

Natalie Morgan

**AMENDMENT TRANSMITTAL**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

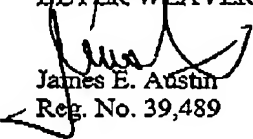
Transmitted herewith is an Amendment in the above-identified application.

The fee has been calculated as shown below.

	Claims After Amendment		Highest Previously Paid For	Present Extra	Small Entity Rate Fee	Large Entity Rate Fee
Total Claims	20	MINUS	20	00	x 25 =	x 50 = 00
Independent Claims	02	MINUS	03	00	x 100 =	x 200 = 00
Multiple Dependent Claim Present and Fee Not Previously Paid						
Total					\$	\$00

- ☐ Applicant(s) hereby petition for a \_\_\_\_\_ month extension(s) of time to respond to the  
aforementioned Office Action.
- ☒ Applicant(s) believe that no (additional) Extension of Time is required; however, if it is  
determined that such an extension is required, Applicant(s) hereby petition that such an extension  
be granted and authorize the Commissioner to charge the required fees for an Extension of Time  
under 37 CFR 1.136 to Deposit Account No. 500388.
- ☐ Enclosed is our Check No. \_\_\_\_\_ in the amount of \$ \_\_\_\_\_ to cover the additional  
claim fee and/or extension of time fees.
- ☒ Please charge the required fees and any additional fees required to facilitate filing the  
enclosed response, to Deposit Account No. 500388 (Order No. NOVLP090).

Respectfully submitted,  
BEYER WEAVER & THOMAS, LLP

  
James E. Austin  
Reg. No. 39,489

P.O. Box 70250  
Oakland, CA 94612-0250

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Title: BIASED H<sub>2</sub> ETCH PROCESS IN  
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Signed: \_\_\_\_\_

Natalie Morgan

**REQUEST FOR CONTINUED EXAMINATION (RCE)  
(37 CFR §1.114)**Mail Stop RCE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

This is a Request for Continued Examination (RCE) of the above-identified application.

**1. Submission required under 37 C.F.R. §1.114:**

- a. ☐ Previously submitted
- i. ☐ Consider the amendment/reply under 37 C.F.R. §1.116 previously filed on \_\_\_\_\_.  
(Any unentered amendment referred to above will be entered.)
- ii. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on \_\_\_\_\_
- iii. ☐ Other \_\_\_\_\_
- b. ☒ Enclosed
- i. ☒ Amendment/Reply
- ii. ☐ Affidavit/Declaration
- iii. ☐ Information Disclosure Statement with Form PTO-1449
- iv. ☐ Copies of IDS Citations
- iv. ☐ Other \_\_\_\_\_

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2. **Fees:** *(The RCE fee is required at the time the RCE is filed.)*

## Fee Calculation (37 CFR §1.16)

Fee for Request for Continued Examination Under 37 C.F.R. §1.17(e)	\$790 =	790.00
TOTAL		790.00
SMALL ENTITY 50% FILING FEE REDUCTION (if applicable)		

- ☐ a. Applicant hereby petitions for a            month extension of time.
- ☒ b. Applicant believes that no (additional) extension of time is required; however, if it is determined that such an extension is required, Applicant hereby petitions that such an extension be granted and authorizes the Director to charge the required fees for an extension of time under 37 CFR §1.136 to Deposit Account No. 500388.
- ☐ c. Enclosed is our Check No.            in the amount of \$            to cover the RCE fee, extension of time and additional fees.
- ☒ d. The Director is authorized to charge the required fees and any fees beyond that amount which may be required, or to credit any overpayment, to Deposit Account No. 500388 (Order No. NOVLP090)
3. ☒ Please continue to send correspondence to the following address:

Customer Number 022434

022434

Date: January 9, 2006

  
James E. Austin  
Registration No. 39,489